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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,170	03/12/2004	John F. Kitchin	200312064-1	9512

22879 7590 07/14/2005

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EXAMINER

ROBBINS, JANET L

ART UNIT PAPER NUMBER

2857

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/799,170

Applicant(s)

KITCHIN, JOHN F.

Examiner

Janet Robbins

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 16-24 is/are rejected.
- 7) ☒ Claim(s) 14 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Drawings

2. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
3. The drawings are objected to because Figure 4A and Figure 4B are not clear, making the text difficult to read. Figure 3 is too dark making it difficult to distinguish between lines 508 and 506. Corrected drawing sheets in compliance with 37 CFR

1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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5. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Desplats et al. (US Patent 6,891,363). Desplats et al. teaches a method of determining distortion in a circuit image (col 1, ln 9-12; col 3, ln 24-27; col 7, ln 8-10), comprising:

measuring photon emissions (col 7, ln 23-25, ln 33-35) for a potential photon emission area (col 9, ln 6, ln 9-10);

comparing (col 3, ln 64-67; col 9, ln 45-47; col 21, ln 1-7) the expected level of photon emission (col 7, ln 39-41) with the measured photon emissions (col 7, ln 33-35); and

predicting an amount of spatial distortion for the potential photon emission areas based on results of comparing the measured photon emissions to the expected photon emission level (col 3, ln 25-28; col 7, ln 8-10; col 9, ln 34-39; col 22, ln 2-4).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2, 3, 16, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363) in view of Breu (US Patent 5,023,916).

With respect to claim 2, Desplats et al. teaches all the elements of parent claim 1 as shown above. Desplats et al. further teaches defining the potential photon area (col 7, ln 56-59; col 9, ln 6-11; col 18, ln 17-18) but does not teach using a layout database to define the area. Breu teaches using a database for the printed circuit board to find expected locations on a circuit board (col 3, ln 57-69; col 4, ln 3-4). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the database of Breu because the database provides a reliable body of information for use for comparison in the designated area to find the best fit between the measured and the expected data (Breu: Col 2, ln 8-28).

With respect to claim 3, Desplats et al. further teaches determining the expected level of photon emissions over the potential photon emission areas (col 3, ln 64-67; col 4, ln 1; col 7, ln 39-41; col 9, ln 45-49).

With respect to claims 16 and 23, Desplats et al. teaches a system for determining distortion in a circuit image (col 1, ln 9-12; col 3, ln 24-27; col 7, ln 8-10), comprising:

an imaging photomultiplier (Fig. 1.: 102; The IC Imaging station is the functional equivalent of the imaging photomultiplier.) coupled to the processing module and configured to measure photon emissions (col 7, ln 23-25, ln 33-35) for the potential photon emission areas (col 9, ln 6, ln 9-10);

wherein the processing module compares the expected level of photon emissions to the measured photon emissions (col 3, ln 25-28; col 7, ln 8-10; col 9, ln 34-39; col 22, ln 2-4);

and produces a mathematical model that predicts an amount of spatial distortion for each potential photon emission area (col 13, ln 55-67).

Desplats et al. does not teach a layout database nor a processing module configured to determine the expected level of photon emissions over the potential photon emission areas. Breu teaches a storage module comprising a layout database that determines potential photon emission areas (col 3, ln 57-67); and a processing module (In order to run the programming described, it is inherent that there be a processing module; col 2, ln 8-12) coupled to the storage module and configured to determine an expected level of photon emissions over the potential photon emission areas (col 3, ln 57-67). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the layout database and processing module of Breu because the database provides a reliable body of information for use for comparison in the designated area to find the best fit between the measured and the expected data (Breu: Col 2, ln 8-28).

With respect to claim 24, Desplats et al. further teaches a predicting means for predicting an amount of spatial distortion for each potential photon area (col 3, ln 25-28; col 7, ln 8-10; col 9, ln 34-39; col 22, ln 2-4).

8. Claims 4, 6, 7, 10, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363) in view of Tsuchiya (US PGPub 2003/0078503 A1).

With respect to claim 4, Desplats et al. teaches the elements of parent claim 1 as shown above, but does not teach implementing a probability density function (PDF).

Tsuchiya teaches implementing a PDF to predict the amount of spatial distortion (paragraph 0017, 0018, 0033, 0041). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the PDF of Tsuchiya because the calculation permits quick calculation and measurement time (Tsuchiya: paragraph 0024, 0025).

With respect to claim 6, Desplats et al. and Tsuchiya teach the elements of parent claim 4 as shown above. Tsuchiya further teaches determining a cumulative distribution function (CDF) by convolving the expected level of photon emission with the PDF (paragraph 0034, 0035, 0058). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings Desplats et al. to include the CDF of Tsuchiya because the calculation permits quick calculation and measurement time (Tsuchiya: paragraph 0024, 0025).

With respect to claim 7, Desplats et al. and Tsuchiya teach the elements of parent claim 4 as shown above. Tsuchiya further teaches approximating the measured photon emissions using the CDF (paragraph 0034, 0035, 0058, 0158). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings Desplats et al. to include the CDF of Tsuchiya because the calculation permits quick calculation and measurement time (Tsuchiya: paragraph 0024, 0025).

With respect to claim 10 and 11, Desplats et al. teaches the elements of parent claim 1 as shown above. Desplats et al. further teaches defining a photon emission area for each phenomena (col 4, ln 7-31). Desplats et al. does not teach modeling this data. Tsuchiya teaches using a model to describe the acquired data (Tsuchiya:

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paragraph 0036). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the modeling of Tsuchiya because the model permits precise and quick calculation of a distribution of photon paths (Tsuchiya: paragraph 0025).

With respect to claim 12, Desplats et al. teaches the elements of parent claim 1 as shown above. Desplats et al. further teaches weighting the amount of spatial distortion by time distortion (col 4, ln 7-31). Desplats et al. does not teach modeling this data. Tsuchiya teaches utilizing a model to describe the acquired data (Tsuchiya: paragraph 0036). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the modeling of Tsuchiya because the model permits precise and quick calculation of a distribution of photon paths (Tsuchiya: paragraph 0025).

With respect to claim 13, Desplats et al. and Tsuchiya teach the elements of parent claim 12 as shown above. Desplats et al. further teaches the spatial distortion and time distortion are mutually independent (col 20, ln 58-61).

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363), in view of Tsuchiya (US PGPub 2003/0078503 A1), and further in view of Ishiga (US PGPub 2003/0026477 A1). Desplats et al. and Tsuchiya teach the elements of parent claim 4 as shown above, but do not teach implementing a Laplace distribution as the PDF. Ishiga teaches using a Laplace distribution as the PDF (Ishiga: paragraph 0073). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. and Tsuchiya to

include the Laplace distribution of Ishiga because the Laplace distribution has a sharper peak at the mean than the normal distribution making the point of interest more clearly represented.

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363) in view of Barrett et al. (US Patent 6,392,235). Desplats et al. teaches the elements of parent claim 1 as shown above, but does not teach representing the measured photon emissions using vectors of unequal length to reduce mathematical computations. Barrett et al. teaches representing photon emissions with vectors which each have different lengths (Barrett et al.: col 6, ln 53-67). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the vectors of Barrett et al. because data processing in this manner will improve spatial resolution and will remain constant over a range of depths (Barrett et al.: col 4, ln 37-43).

11. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363) in view of Ackermann et al. (US Patent 6,839,656). Desplats et al. teaches the elements of parent claim 1 as shown above, but does not teach predicting the distortion using a NHPP. Ackermann et al. teaches predicting the amount of spatial distortion comprising using a Non-Homogenous Poisson Process (NHPP) (Ackermann et al.: col 1, ln 64-67; col 2, ln 37-42; col 3, ln 24-28; col 6, ln 12-16). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the NHPP of Ackermann

et al. because the NHPP predicts the amount of error without using memory for each time-point (Ackermann et al.: col 2, ln 42-44).

12. Claims 17, 18, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363), in view of Breu (US Patent 5,023,916), and further in view of Tsuchiya (US PGPub 2003/0078503 A1).

With respect to claims 17 and 18, Desplats et al. and Breu teach the elements of parent claim 16 as shown above, but do not teach implementing a PDF. Tsuchiya teaches implementing a probability density function (PDF) to predict the amount of spatial distortion (paragraph 0017, 0018, 0033, 0041). The PDF is an exponential-power distribution (Tsuchiya: eqn. 1, paragraph 0017). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. and Breu to include the PDF of Tsuchiya because the calculation permits quick calculation and measurement time (Tsuchiya: paragraph 0024, 0025).

With respect to claim 19, Desplats et al., Breu, and Tsuchiya teach the elements of parent claim 18. Tsuchiya further teaches determining a cumulative distribution function (CDF) by convolving the expected level of photon emission with the PDF (paragraph 0034, 0035, 0058). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings Desplats et al. to include the CDF of Tsuchiya because the calculation permits quick calculation and measurement time (Tsuchiya: paragraph 0024, 0025).

With respect to claim 21, Desplats et al., Breu and Tsuchiya teach the elements of parent claim 17 as shown above. Desplats et al. further teaches a photon emission

area designated for each phenomenon in a circuit image, and wherein the photon emission area comprises background photon phenomena (Desplats et al.: col 4, ln 7-31; col 9, ln 6-21; col 18, ln 17-25).

13. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363), in view of Breu (US Patent 5,023,916), in view of Tsuchiya (US PGPub 2003/0078503 A1), and further in view of Ackermann et al. (US Patent 6,839,656). Desplats et al., Breu and Tsuchiya teach the elements of parent claim 17 as shown above. Desplats et al. further teaches processing composite time-spatial distortion and time distortion (Desplats et al.: col 4, ln 7-11). Tsuchiya teaches utilizing a model to describe the acquired data (Tsuchiya: paragraph 0036). Desplats et al., Breu, and Tsuchiya do not teach utilizing NHPPs. Ackermann et al. teaches predicting the amount of spatial distortion comprising using a Non-Homogenous Poisson Process (NHPP) (Ackermann et al.: col 1, ln 64-67; col 2, ln 37-42; col 3, ln 24-28; col 6, ln 12-16). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the NHPP of Ackermann et al. because the NHPP predicts the amount of error (distortion) without using memory for each time-point (Ackermann et al.: col 2, ln 42-44).

14. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Desplats et al. (US Patent 6,891,363), in view of Breu (US Patent 5,023,916) and further in view of Barrett et al. (US Patent 6,392,235). Desplats et al. and Breu teach the elements of parent claim 16 as shown above, but do not teach representing the measured photon emissions using vectors of unequal length to reduce mathematical computations.

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Barrett et al. teaches representing photon emissions with vectors which each have different lengths (Barrett et al.: col 6, ln 53-67). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Desplats et al. to include the vectors of Barrett et al. because data processing in this manner will improve spatial resolution and will remain constant over a range of depths (Barrett et al.: col 4, ln 37-43).


Allowable Subject Matter

15. Claims 14 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janet Robbins whose telephone number is 571-272-8584. The examiner can normally be reached on weekdays from 7:30am - 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc Hoff can be reached on 571-272-2216. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

JLR
July 6, 2005


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